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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,368	07/15/2003	Theodore Robert Grossman	128483	1367

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EXAMINER
WHITEHEAD, ELIZABETH A

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,368	GROSSMAN ET AL.	
	Examiner	Art Unit	
	Elizabeth Whitehead	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-20* is/are allowed.

6)☒ Claim(s) *1-6 and 10* is/are rejected.

7)☒ Claim(s) *7-9 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/13/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. U.S. patent application 10/248056 to Spitsberg et al. mentioned throughout the specification has been noted. The status of the patent application (i.e. patented, abandoned) should be updated.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Ref No. 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

4. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a

person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spitsberg ('500) in view of Dunning et al. ('310).

6. Spitsberg ('500) discloses a process to improve the oxidation resistance of an aluminide bond coat (Col. 2, lines 53-56) comprising the steps of depositing the bond coat on the surface of the substrate so as to be characterized by columnar grains having grain boundaries exposed at the surface of the bond coat (Col. 2, lines 60-66 and Claim 1), peening the surface of the bond coat with stainless steel shot (Col. 6, lines 52-53), and heating the bond coat to a sufficient temperature to recrystallize the additive layers of the bond coat (Col. 6, lines 58-61).

7. Regarding Claim 1, Spitsberg ('500) does not disclose that the peening media is formed of a composition containing nickel and aluminum. Dunning et al. ('310) discloses that aluminum is frequently added to stainless steel containing nickel and chromium to enhance oxidation resistance (Col. 1, lines 40-41 and Col. 4, lines 53-55). It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use stainless steel shot as the peening media, as is generally conventional, containing nickel and aluminum in order to enhance the oxidation resistance of the overlay coating as stated in the instant claims.

8. Also regarding Claim 1, Spitsberg ('500) does not disclose that upon recrystallization, the overlay coating forms new grain boundaries that are not open to the surface of the bond coat. However, the instant application discloses that the new grain boundaries that are not open to the surface of the bond coat are formed by bulk

recrystallization of the bond coat, which can be induced by a surface mechanical treatment (e.g. peening) that introduces cold working into the bond coat, so that the surface of the bond coat undergoes recrystallization when heated to a sufficient temperature. Since the process suggested by the prior art includes peening the surface of the bond coat with a particulate media containing nickel and aluminum and heating the bond coat to a sufficient temperature to recrystallize the additive layers of the bond coat, the formation of the new grain boundaries that are not open to the surface of the bond coat necessarily flows from the aforementioned steps. Thus, the process disclosed by the prior art would necessarily result in the formation of the new grain boundaries that are not open to the surface of the bond coat.

9. Regarding Claim 2, Spitsberg ('500) further discloses that a sufficient temperature to cause recrystallization of the bond coat is about 1120°C (Col. 6, line 59). The temperature of 1120°C anticipates a value within the claimed range of at least 900°C.

10. Regarding Claim 3, Spitsberg ('500) discloses that the bond coat contains an additive layer mainly composed of beta-phase nickel aluminide (Col. 4, lines 49-53).

11. Regarding Claim 4, Spitsberg ('500) does not disclose that the new grain boundaries formed upon recrystallization of the bond coat contain fewer precipitates than the as-deposited grain boundaries. However, the instant application discloses that the recrystallization process to form the new grain boundaries reduces the amount of precipitates present within the grain boundaries. Since the process suggested by the prior art includes a recrystallization process that would produce new grain boundaries,

the decreased amount of precipitates in the new grain boundaries necessarily flows from said recrystallization process. Thus, the process disclosed by the prior art would necessarily result in the new grain boundaries containing fewer precipitates than the as-deposited grain boundaries.

12. Regarding Claim 5, Spitsberg ('500) discloses that the additive layer can be modified by additional elements such as zirconium and hafnium (Col. 4, lines 53-57).

13. Regarding Claim 10, Spitsberg ('500) discloses that a ceramic layer is deposited on the bond coat to form a thermal insulating ceramic (TBC) layer (Col. 4, lines 25-27).

14. Thus, Claims 1-5 and 10 would have been obvious within the meaning of 35 USC 103 over the teachings of Spitsberg ('500) in view of Dunning et al. ('310).

15. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spitsberg ('500) in view of McGurty ('898).

16. Spitsberg ('500) is relied upon for the disclosure described in the rejection of Claims 1 and 5 as set forth above.

17. Spitsberg ('500) does not disclose that the particulate media used in the peening step is an intermetallic containing at least one of zirconium and hafnium.

18. McGurty ('898) discloses that large amounts of zirconium and hafnium can be added to stainless steel to improve oxidation resistance (Col. 2, line 66 and Col. 3, lines 1-8).

19. It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the stainless steel shot (an intermetallic) of Spitsberg ('500) as the peening media which contains zirconium and hafnium as described by

McGurty ('898) in order to improve the oxidation resistance of the bond coat as stated in the instant claims.

20. Thus, Claim 6 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Spitsberg ('500) and McGurty ('898).

Allowable Subject Matter

21. Claims 7-9 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. Claims 12-20 are allowed.

23. The following is a statement of reasons for the indication of allowable subject matter: Regarding Claims 7-9, the prior art of record shows peening with stainless steel, which contains iron. The prior art does not meet the limitation of using peening media containing nickel and aluminum and being essentially free of iron or using peening media comprising a metallic solid solution and yttrium. The prior art does not meet the limitation of producing peening media to have finer and coarser particles where the coarser particles would be used in the peening step and the finer particles would be plasma-sprayed onto a second substrate. Regarding Claim 11, the prior art of record shows subjecting the thermal barrier coating system to an elevated temperature to form an oxide scale, but because the peening media contains iron, the oxide scale would form an iron-containing spinel. The prior art does not meet the limitation of forming an oxide scale being substantially free of spinel. The prior art does not teach or reasonably suggest the beta-phase nickel aluminide coating method or materials of claims 12-20.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Whitehead whose telephone number is (571) 272-6647. The examiner can normally be reached on Monday-Friday, 7:00 AM-3:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

eaw

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER